



# Air Force Research Laboratory|AFRL

*Science and Technology for Tomorrow's Air and Space Force*



## Success Story

### NEW DUAL-BAND FOCAL PLANE ARRAY INTERCONNECT TECHNOLOGY FOR JET PROPULSION LABORATORY QUANTUM WELL INFRARED PHOTODETECTOR TECHNOLOGY



A dual-band Quantum Well Infrared Photodetector (QWIP) focal plane array (FPA) (with band centers near 9 and 14 microns) provides for simultaneous dual-band imaging. When operated in an integrated camera assembly, the image quality is sufficiently high to see both temperature variations on an individual's hand as well as the radiation from the hand reflected from a metallic optics table. The technology shows great promise in allowing future hybridization using more closely spaced interconnects needed for smaller pixel pitches and multiple wavebands, and using metals more robust than indium.



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### **Accomplishment**

Ongoing small business innovation research (SBIR) at Microwave Bonding Incorporated (MBI), monitored by the Space Vehicles Directorate, demonstrates the feasibility of a new hybridization approach for QWIP detector arrays and their associated cryogenic multiplexers. Working closely with Jet Propulsion Laboratory (JPL) QWIP personnel, MBI has demonstrated the first-ever hybridization of an infrared detector array with its cryogenic multiplexer through the fusing of indium interconnects with microwave energy. MBI localizes the microwave energy deposition to the indium bumps, preventing elevated temperatures from damaging the detector array structures.

### **Background**

QWIP FPA development at JPL has been under way for several years, with some programs having joint technical oversight with the directorate. Interconnect technology advances, made possible under the directorate's SBIR, will allow future JPL devices to achieve larger FPA dimensions and multiwaveband capability.

Space Vehicles  
Emerging Technologies

### **Additional information**

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-VS-13)